Trend Study 17-16-02

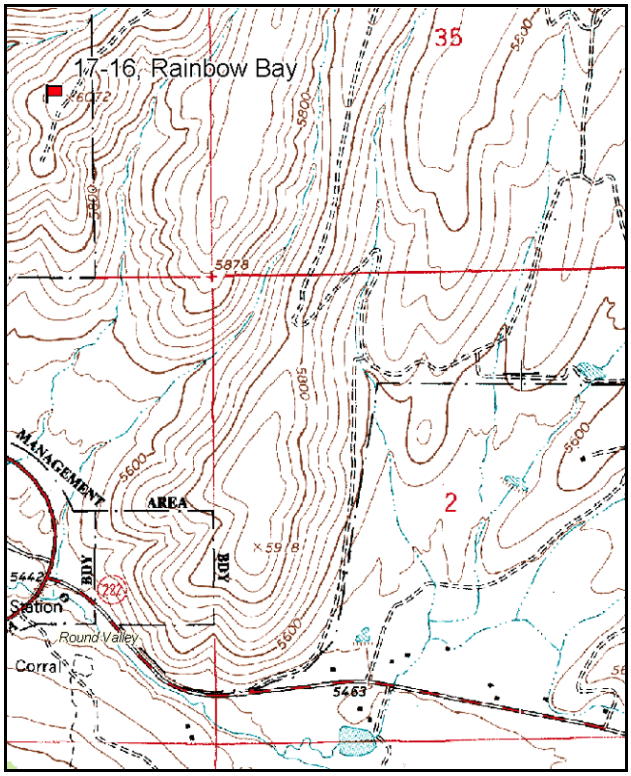
Study site name: Rainbow Bay . Vegetation type: Big Sagebrush-Grass .

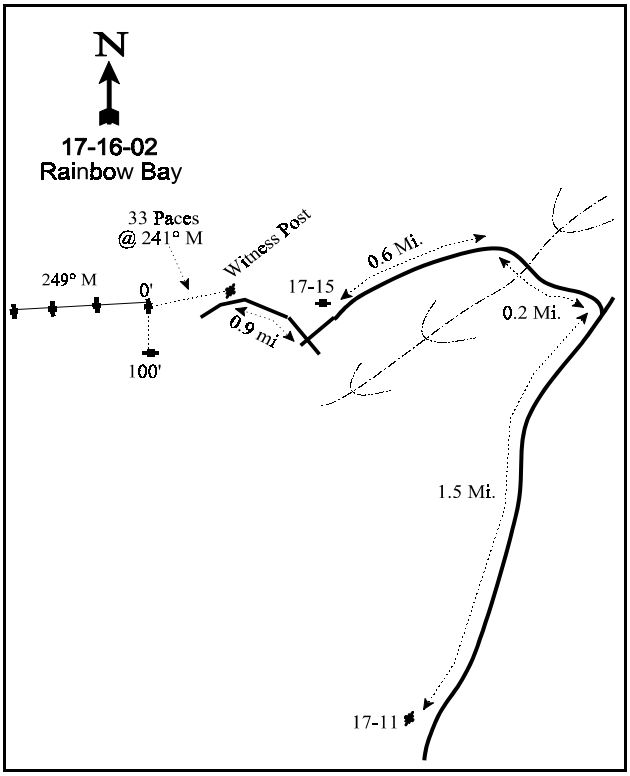
Compass bearing: frequency baseline 345 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Beginning at the intersection of U.S. 189 and the Wallsburg turnoff, proceed 0.50 miles towards Wallsburg to an intersection. Turn left at the intersection and proceed northerly for just over 1 mile passing through two DWR gates to another intersection, and turn right. Proceed 0.05 miles to a small rock pile on the left (east) side of the road which marks study #17-11, Wallsburg Turn. Continue down the road 1.5 miles from study 17-11 to a fork. Bear left and go 0.2 miles thru a drainage to another ridge top and bear left. Drive along the ridge 0.6 miles to a witness post on the north side of the road which marks study #17-15. Continue down this road to an intersection with a short telephone post and a Mountain Bell wire warning sign. Turn left and stay left for 0.9 miles to a witness post on the north side of the road. From the witness post, the 0-foot stake is 33 paces away at an azimuth of 241 degrees magnetic, marked with browse tag #3947.





Map Name: Charleston

Diagrammatic Sketch

Township 4S , Range 4E , Section 34

GPS: NAD 27, UTM 12S 4474831 N 459486 E

DISCUSSION

Rainbow Bay - Trend Study No. 17-16

This study is located on big sagebrush-grass rangeland near the top of the high knoll immediately east of Rainbow Bay on Deer Creek Reservoir. The site is relatively dry as it lies on a moderate sloping (15-20%) west to southwest facing hillside. Elevation is approximately 6,000 feet. This area, although within a few hundred meters of the 1976 burn, was spared from the fire. However, it does appear that the area did burn during one of the earlier fires in the late 1960's or early 1970's. The presence of numerous fire scarred sagebrush stumps provides evidence of a past fire on the site. Winter deer and elk use was reportedly heavy prior to 1989. Data and observations in 1989 showed only light to moderate levels of hedging and pellet group densities. In 1996 and 2002, deer use was high while elk use was light to moderate. Pellet group transect data collected in 2002 estimated 100 deer days use/acre (248 ddu/ha) and 26 elk days use/acre (64 edu/ha). Cattle were seen below the site in 1996, but use of site by livestock has been minimal.

Soils are derived from sedimentary limestone and have a clay loam texture. Average soil temperature at 11 inches was 51°F in 1996. Soil reactivity is neutral (pH of 7.2). There are more bare patches of soil with quite a bit of erosion pavement near the ridge top. In 1983, it was reported that there were no large gullies present but sheet erosion was obvious. Also, a large percentage of the ground surface was occupied either by erosion pavement, bare ground, or a thin cover of cheatgrass litter. Perennial plants were also reported to be pedestalled. Rock and pavement cover have declined since that time and erosion did not appear to be a problem in 1996 and 2002. Bare ground cover increased slightly in 1996 and 2002, but vegetation and litter cover are abundant and appear adequate to protect the soil at this time. A soil erosion assessment done in 2002 gave a stable condition rating.

The mountain big sagebrush population has steadily declined with each reading. Density was estimated at 1,520 plants/acre in 1996, decreasing to 1,060 plants/acre in 2002. Big sagebrush density was much higher in 1983 and 1989, but with the small sample size used in those years, the population was most likely overestimated. Decadency has been high during the last three readings with about one-half of the population being classified as such. Vigor has slowly declined with each successive reading as well. Utilization has been moderate in most years. Recruitment of young plants was moderate in 1983 and 1989, but has declined to low levels in 1996 and 2002. There are not enough young in the population to replace the decadent and dying plants that will likely be lost in the future. Annual leader growth on sagebrush averaged 2.8 inches in 2002. There was almost as many dead plants as live in 2002.

Antelope bitterbrush density was estimated at 340 plants/acre in 2002, a decrease from 480 plants/acre in 1996. Use was moderate to heavy in 1996 and 2002, but vigor was normal and decadency low. Bitterbrush annual leader growth averaged 3 inches in 2002.

The broom snakeweed density increased to an estimated 14,580 plants/acre in 1996, but declined to 3,500 plants/acre in 2002 with the drought. Snakeweed highly fluctuates with precipitation. Most of the broom snakeweed is located near the ridge top where open patches exist. Stickyleaf low rabbitbrush had an estimated density of 820 plants/acre in 2002, a slight increase from 640 in 1996. This species shows no use, good vigor, and virtually no decadency in all years. Other browse species include serviceberry, prickly pear, and gray horsebrush.

The herbaceous understory is abundant and diverse. Perennial grass sum of nested frequency has increased since 1989, due to increases in bluebunch wheatgrass, crested wheatgrass, and Sandberg bluegrass. Cheatgrass is abundant on the site as well. Between 1996 to 2002, cheatgrass more than doubled in average cover, but remained stable in both nested and quadrat frequencies. This was somewhat of a surprise with the drought conditions of 2002, as cheatgrass often declines during drought. Other grasses include Indian ricegrass, mutton bluegrass, and bulbous bluegrass.

Forbs are diverse with 28 species sampled on the site in 2002. Sum of nested frequency for perennial forbs steadily increased between 1983 and 1996. With drought in 2002, perennial forb sum of nested frequency declined by 57%. Some of the important perennial species include pale agoseris, silky milkvetch, paintbrush, spring parsley, and yellow salsify. Most of these species declined in frequency during the 2002 reading. The abundance of annual forbs also declined in 2002 with the dry conditions. Annuals are predominantly composed of low growing species such as holosteum, alyssum, and little flower collinsia. It was noted in 1996 that the parsley and arrowleaf balsamroot were being utilized.

1983 APPARENT TREND ASSESSMENT

Soil trend appears stable to declining. Vegetative cover, especially from grasses and forbs, is inadequate to prevent rapid sheet erosion. Vegetative trend is less obvious. The browse component appears stable and could improve if antelope bitterbrush is able to increase in density. However, grasses and forbs are obviously deficient and show few signs of any rapid increase. An ominous sign is the abundance of cheatgrass brome. The potential for a destructive fire will be high as long as cheatgrass continues to be a major part of the composition.

1989 TREND ASSESSMENT

Trend for soil is slightly up. Bare soil remains low at 4%. Perennial grasses and forbs increased in sum of nested frequency providing additional protection against erosion. Trend for browse is slightly down. Mountain big sagebrush density declined and decadence increased to 45%. Trend for the herbaceous understory is slightly up with sum of nested frequency values for perennial grasses and forbs both improving.

TREND ASSESSMENT
soil - slightly up (4)
browse - slightly down (2)
herbaceous understory - slightly up (4)

1996 TREND ASSESSMENT

Soil trend is stable with litter and vegetation being adequate to protect against erosion. Although bare ground has increased since 1989, it is not excessive. The mountain big sagebrush and bitterbrush populations are slowly declining over time. Decadence and poor vigor increased in the sagebrush population. Broom snakeweed has greatly increased in density, but this may be due to the greatly increased sample size used in 1996. The browse trend is slightly downward. The herbaceous understory trend is slightly upward due to the increase in sum of nested frequency for grasses and forbs since 1989. Many of the species are perennials with some seeded grasses encountered. The herbaceous understory exhibits high diversity, but many of the species are in low abundance.

TREND ASSESSMENT
soil - stable (3)
browse - slightly downward (2)
herbaceous understory - slightly upward (4)

2002 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics are similar to 1996 estimates. Bare soil increased from 7% to 11%, but total herbaceous cover increased and soils still exhibit minimal erosion. Trend for browse remains slightly down, with the browse component was considered in poor condition. Mountain big sagebrush declined in density and vigor, and decadence remains high at 49%. Recruitment is low, while dead sagebrush plants are nearly as abundant as live ones. Bitterbrush also slightly declined in density and increased decadence. Trend for the herbaceous understory is slightly down due to a 57% decline in the sum of nested frequency for perennial forbs. Forb loss is due to the drought in 2002 and will likely improve with better precipitation in the future. Sum of nested frequency for perennial grasses increased slightly, but not enough to offset the loss of perennial forbs.

TREND ASSESSMENT
soil - stable (3)
browse - slightly down (2)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 16

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
G	Agropyron cristatum	a6	a13	a18	b41	4	5	7	12	1.39	3.54
G	Agropyron intermedium	a-	ab2	b12	ab8	-	2	6	4	.22	.02
G	Agropyron spicatum	a70	b150	c222	bc182	30	56	75	64	10.96	10.41
G	Bromus japonicus (a)	-	-	a-	b43	-	-	-	21	-	.18
G	Bromus tectorum (a)	-	-	270	261	-	-	84	84	3.04	7.90
G	Oryzopsis hymenoides	a-	ab11	b11	ab4	-	4	5	1	.19	.18
G	Poa bulbosa	a-	a3	a-	b25	-	1	-	9	-	.58
G	Poa fendleriana	-	-	6	-	-	-	2	-	.06	-
G	Poa secunda	a5	ab26	b42	c89	2	14	16	36	.45	1.95
G	Sitanion hystrix	-	1	-	1	-	1	-	1	-	.03
Total for Annual Grasses		0	0	270	304	0	0	84	105	3.04	8.07
Total for Perennial Grasses		81	206	311	350	36	83	111	127	13.28	16.71
Total for Grasses		81	206	581	654	36	83	195	232	16.32	24.79
F	Agoseris glauca	a-	ab2	c91	b17	-	1	45	10	.82	.10
F	Allium acuminatum	a-	a-	b14	c41	-	-	8	18	.18	.17
F	Alyssum alyssoides (a)	-	-	b289	a83	-	-	91	37	1.41	.28
F	Arabis spp.	a-	b11	ab3	3	-	6	2	1	.01	.00
F	Artemisia ludoviciana	3	1	-	-	1	1	-	-	-	-
F	Astragalus cibarius	a-	a-	c123	b22	-	-	57	13	4.16	.11
F	Astragalus convallarius	-	-	2	-	-	-	1	-	.00	-
F	Astragalus utahensis	b19	b17	ab6	a1	7	8	2	1	.03	.00

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
F	Balsamorhiza sagittata	a7	b44	c76	c67	4	20	38	33	4.84	5.31
F	Castilleja linariaefolia	a-	a-	c40	b11	-	-	24	5	.22	.36
F	Calochortus nuttallii	a1	b41	a12	a13	1	22	6	7	.03	.03
F	Chaenactis douglasii	-	3	-	-	-	1	-	-	-	-
F	Cirsium spp.	a3	a-	b8	a-	1	-	6	-	.05	-
F	Collomia linearis (a)	-	-	b101	a3	-	-	47	2	.28	.01
F	Comandra pallida	a8	b22	a-	a-	3	10	-	-	-	-
F	Collinsia parviflora (a)	-	-	a252	b328	-	-	84	97	2.10	5.61
F	Crepis acuminata	a4	b20	ab12	ab12	2	10	7	7	.08	.16
F	Cymopterus longipes	a-	a22	c101	b27	-	12	51	16	.80	.15
F	Delphinium nuttallianum	a-	a-	b11	ab5	-	-	5	2	.07	.01
F	Descurainia pinnata (a)	-	-	-	1	-	-	-	1	-	.00
F	Draba spp. (a)	-	-	b58	a34	-	-	23	12	.16	.08
F	Eriogonum brevicaule	-	-	-	2	-	-	-	1	-	.00
F	Erigeron pumilus	-	-	9	-	-	-	3	-	.01	-
F	Eriogonum racemosum	12	37	22	30	8	19	15	15	.15	.26
F	Eriogonum umbellatum	-	-	4	-	-	-	2	-	.01	-
F	Gayophytum ramosissimum (a)	-	-	3	-	-	-	1	-	.00	-
F	Hackelia patens	-	-	3	8	-	-	1	4	.03	.02
F	Helianthus annuus (a)	a5	c83	a-	b24	3	40	-	10	-	.07
F	Holosteum umbellatum (a)	-	-	b179	a89	-	-	55	39	1.15	.29
F	Linaria dalmatica	-	-	-	4	-	-	-	2	-	.15
F	Lithospermum ruderale	a-	ab3	b8	ab8	-	1	5	2	.05	.06
F	Lupinus argenteus	3	4	5	1	1	2	4	1	.27	.15
F	Machaeranthera canescens	-	3	2	-	-	1	1	-	.00	-
F	Medicago sativa	3	-	-	-	1	-	-	-	-	-
F	Microsteris gracilis (a)	-	-	a-	b43	-	-	-	16	-	.18
F	Orthocarpus spp. (a)	-	-	3	-	-	-	1	-	.00	-
F	Penstemon spp.	a1	b66	a-	a-	1	34	-	-	-	-
F	Phlox longifolia	-	-	8	-	-	-	4	-	.02	-
F	Polygonum douglasii (a)	-	-	b103	a-	-	-	41	-	.22	-
F	Ranunculus testiculatus (a)	-	-	4	9	-	-	1	3	.00	.01
F	Sphaeralcea coccinea	-	-	-	1	-	-	-	1	-	.03
F	Sphaeralcea grossulariaefolia	-	-	-	2	-	-	-	1	-	.03
F	Taraxacum officinale	-	-	3	-	-	-	1	-	.00	-
F	Tragopogon dubius	a2	b31	c76	a-	2	15	34	-	.45	-
F	Unknown forb-perennial	-	7	-	-	-	4	-	-	-	-
F	Vicia americana	-	2	-	-	-	2	-	-	-	-
F	Viguiera multiflora	-	1	6	-	-	1	3	-	.04	-

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'96	'02	'83	'89	'96	'02	'96	'02
Total for Annual Forbs		5	83	992	614	3	40	344	217	5.38	6.56
Total for Perennial Forbs		66	337	645	275	32	170	325	140	12.38	7.17
Total for Forbs		71	420	1637	889	35	210	669	357	17.76	13.73

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 17 , Study no: 16

Type	Species	Strip Frequency		Average Cover %	
		'96	'02	'96	'02
B	Amelanchier alnifolia	3	3	-	.03
B	Artemisia tridentata vaseyana	57	41	9.22	6.10
B	Chrysothamnus viscidiflorus viscidiflorus	19	22	1.37	2.20
B	Gutierrezia sarothrae	91	58	3.22	2.12
B	Opuntia spp.	14	14	.12	.36
B	Purshia tridentata	20	16	3.81	6.55
B	Symphoricarpos oreophilus	0	1	-	.03
B	Tetradymia canescens	0	1	.15	.38
Total for Browse		204	156	17.91	17.79

CANOPY COVER -- LINE INTERCEPT
Herd unit 17 , Study no: 16

Species	Percent Cover	
	'96	'02
Amelanchier utahensis	-	.17
Artemisia tridentata vaseyana	-	6.00
Chrysothamnus viscidiflorus viscidiflorus	-	1.75
Gutierrezia sarothrae	-	.83
Opuntia spp.	-	.05
Purshia tridentata	-	6.25
Tetradymia canescens	-	.50

Key Browse Annual Leader Growth
Herd unit 17 , Study no: 16

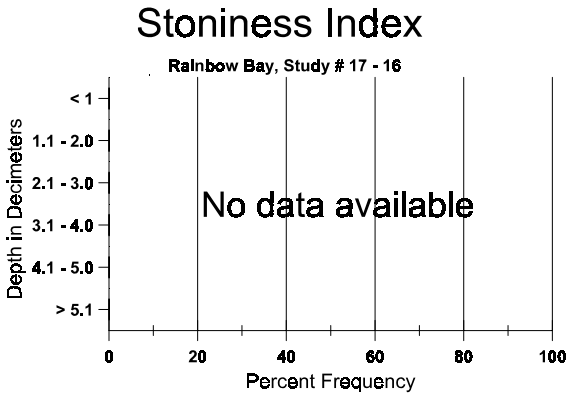
Species	Average leader growth (in)
	'02
Artemisia tridentata vaseyana	2.8
Purshia tridentata	3.0

BASIC COVER --
Herd unit 17 , Study no: 16

Cover Type	Nested Frequency		Average Cover %			
	'96	'02	'83	'89	'96	'02
Vegetation	399	388	1.50	6.25	49.61	48.02
Rock	211	151	2.75	3.50	6.05	3.92
Pavement	262	278	33.25	36.75	6.51	10.85
Litter	398	393	57.75	46.25	49.93	48.27
Cryptogams	111	46	.25	3.25	1.35	.76
Bare Ground	192	227	4.50	4.00	7.23	11.08

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 16, Rainbow Bay

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.4	51.0 (10.9)	7.2	42.6	27.4	30.0	3.6	27.5	265.6	.7



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 16

Type	Quadrat Frequency		Pellet Transect	
	'96	'02	Pellet Groups per Acre ⁄02	Days Use per Acre (ha) ⁄02
Rabbit	-	4	-	-
Elk	21	9	339	26 (64)
Deer	40	53	1305	100 (248)
Cattle	1	-	-	-

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 16

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	1	-	-	-	-	-	-	-	-	-	1	33			1
	96	-	2	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	1	1	-	-	-	-	-	-	2	-	-	-	40			2
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	15	18	1
	02	-	-	1	-	-	-	-	-	-	1	-	-	-	20	11	11	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	100%	100%	+45%
'96	67%	00%	00%	+ 0%
'02	33%	67%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'83	0		-
	'89	33		-
	'96	60		-
	'02	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	4	-	-	1	-	-	-	-	-	5	-	-	-	166			5
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	24	-	-	-	-	-	-	-	-	24	-	-	-	800			24
	89	13	-	-	1	-	-	-	-	-	14	-	-	-	466			14
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	83	60	29	6	-	-	-	-	-	-	95	-	-	-	3166	26	28	95
	89	22	24	1	1	-	-	-	-	-	48	-	-	-	1600	26	31	48
	96	13	17	1	4	1	-	-	-	-	36	-	-	-	720	23	43	36
	02	9	7	4	4	-	-	-	-	-	24	-	-	-	480	27	42	24
D	83	9	8	6	-	-	-	-	-	-	23	-	-	-	766			23
	89	16	31	4	-	-	-	-	-	-	48	-	3	-	1700			51
	96	11	27	-	1	-	-	-	-	-	30	-	-	9	780			39
	02	11	13	2	-	-	-	-	-	-	12	1	-	13	520			26
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	500			25
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	800			40

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	26%	08%	00%	-20%
'89	49%	04%	03%	-60%
'96	59%	01%	12%	-30%
'02	38%	11%	25%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'83	4732		16%
	'89	3766		45%
	'96	1520		51%
	'02	1060		49%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	16	-	-	8	-	-	-	-	-	24	-	-	-	800			24
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	53	-	-	-	-	-	-	-	-	53	-	-	-	1766	9	9	53
	89	59	-	-	11	-	-	-	-	-	69	-	1	-	2333	12	13	70
	96	30	-	-	2	-	-	-	-	-	32	-	-	-	640	12	23	32
	02	40	-	-	-	-	-	-	-	-	40	-	-	-	800	11	18	40
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+44%
'89	00%	00%	01%	-80%
'96	00%	00%	00%	+22%
'02	00%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	1766	Dec:	0%
	'89	3166		1%
	'96	640		0%
	'02	820		2%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	96	876	-	-	-	-	-	-	-	-	876	-	-	-	17520			876
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	17	-	-	-	-	-	-	-	-	17	-	-	-	566			17
	96	225	-	-	-	-	-	-	-	-	225	-	-	-	4500			225
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	57	-	-	-	-	-	-	-	-	57	-	-	-	1900	10	13	57
	89	117	-	-	1	-	-	-	-	-	118	-	-	-	3933	11	11	118
	96	496	-	-	-	-	-	-	-	-	496	-	-	-	9920	7	10	496
	02	126	-	-	-	-	-	-	-	-	121	5	-	-	2520	7	8	126
D	83	1	-	-	-	-	-	-	-	-	-	-	1	-	33			1
	89	7	-	-	-	-	-	-	-	-	7	-	-	-	233			7
	96	8	-	-	-	-	-	-	-	-	7	-	-	1	160			8
	02	48	-	-	1	-	-	-	-	-	25	-	-	24	980			49
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	5020			251

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	02%	+59%
'89	00%	00%	00%	+68%
'96	00%	00%	.13%	-76%
'02	00%	00%	14%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	1933	Dec:	2%
	'89	4732		5%
	'96	14580		1%
	'02	3500		28%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	1	-	-	-	-	-	1	-	-	-	33			1
	96	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
	02	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	7	-	-	1	-	-	-	-	-	8	-	-	-	160	5	13	8
	02	8	-	-	1	-	-	1	-	-	9	-	1	-	200	5	11	10
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	-	-	-	1	-	-	1	40			2
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	+88%
'96	00%	00%	07%	+ 7%
'02	00%	00%	07%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
'83	0		0%
'89	33		0%
'96	280		14%
'02	300		20%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	89	8	-	-	-	-	-	-	-	-	8	-	-	-	266			8
	96	2	1	-	1	-	-	-	-	-	4	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	3	3	1	-	-	-	-	-	-	7	-	-	-	233	41	124	7
	89	8	4	1	-	-	-	-	-	-	13	-	-	-	433	41	81	13
	96	2	3	7	-	1	4	-	-	2	19	-	-	-	380	24	59	19
	02	-	1	9	-	-	5	-	-	-	15	-	-	-	300	30	62	15
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	1	-	-	-	1	-	-	-	20			1
	02	-	-	1	-	-	1	-	-	-	2	-	-	-	40			2
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	33%	11%	00%	+57%
'89	19%	05%	00%	-31%
'96	21%	58%	00%	-29%
'02	06%	94%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	299	Dec:	0%
'89	699		0%
'96	480		4%
'02	340		12%

Symphoricarpos oreophilus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'96	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	0	Dec:	-
'89	0		-
'96	0		-
'02	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia canescens																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15	23	0
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	15	24	1
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'83	00%	00%	00%
'89	00%	00%	00%
'96	00%	00%	00%
'02	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	0	Dec:	-
	'89	0		-
	'96	0		-
	'02	20		-